

WHAT IS CLAIMED IS:

1. A parking assisting device comprising:
a camera for capturing an image behind a vehicle;
a display provided to a dashboard of the vehicle;
passage width measurement means for measuring a width of a passage; and
a controller for displaying the image captured with the camera on the display, and for calculating operating an initial stopping position required for parking the vehicle in-parallel into a target parking space on the basis of the passage width measured with the passage width measurement means, to superimpose on a screen of the display a displayed image for guidance used for guiding the vehicle to the initial stopping position.
2. A parking assisting device according to claim 1, wherein the initial stopping position is a position corresponding to a steering wheel operation amount which is determined so that a vehicle front end on a side of the passage does not project from the passage width and the outermost end of rear wheels on a side of the parking space passes an entrance end of a parking space limit line.
3. A parking assisting device according to claim 1, wherein the initial stopping position is substantially at a center of the passage width.
4. A parking assisting device according to claim 1, further comprising a steering angle sensor,
a driver operating a steering wheel to move the vehicle backward so that the vehicle enters an entrance of the parking space from the initial stopping position, carrying out turning operations in which forward movement of the vehicle made by fully steering the steering wheel to one direction and backward movement of the vehicle

made by fully steering the steering wheel to the opposite direction are repeated, and moving the vehicle straight back to thereby park the vehicle in-parallel into the parking space.

5. A parking assisting device according to claim 4, further comprising yaw angle detection means for detecting a yaw angle of the vehicle,

the controller calculating a position where the steering operation for the steering wheel should be changed during parking the vehicle into the parking space from the initial stopping position, and identifying a position of the vehicle from a yaw angle of the vehicle detected with the yaw angle detection means to provide a driver with guide information with respect to the position where the steering operation for the steering wheel should be changed.

6. A parking assisting device according to claim 5, wherein when a rear axle center of the vehicle reaches approximately a center of the parking space, and at the same time, a vehicle direction becomes approximately parallel with the parking space, the controller informs the driver of completion of the turning of the vehicle.

7. A parking assisting device according to claim 5, wherein an operation for the backward movement made by fully steering the steering wheel is carried out at such a turning angle that during the operation for the backward movement or the operation for the next forward movement after changing the steering operation for the steering wheel, a rear axle center of the vehicle reaches approximately a center of the parking space and at the same time a vehicle direction becomes approximately parallel with the parking space, or at such a turning angle that during next forward movement after changing the steering operation for the steering wheel, when

a front end of the vehicle reaches an edge of a passage, the rear axle center of the vehicle is located on a side of a front side limit line with respect to the center of the parking space.

8. A parking assisting device according to claim 5, wherein an operation for the forward movement made by fully steering the steering wheel is carried out at such a turning angle that during the operation for the forward movement or the operation for the next backward movement after changing the steering operation for the steering wheel, a rear axle center of the vehicle reaches approximately a center of the parking space and at the same time a vehicle direction becomes approximately parallel with the parking space, or at such a turning angle that during next backward movement after changing the steering operation for the steering wheel, when a rear end of the vehicle reaches a rear side limit line of the parking space, the rear axle center of the vehicle is located on a side of a rear side limit line with respect to the center of the parking space.

9. A parking assisting device according to claim 1, wherein the passage width measurement means measures the passage width using the displayed image for guidance on the display when the vehicle is stopped in the initial stopping position or after the vehicle is stopped in the initial stopping position.

10. A parking assisting device according to claim 4, further comprising parking space width measurement means for measuring a width of the parking space,

the controller, in consideration of the width of the parking space measured with the parking space width measurement means, calculating a position where the steering operation for the steering wheel should be changed.

11. A parking assisting device according to claim 1, wherein the controller calculates a locus of a front end of the vehicle on a side of the passage corresponding to a steering angle to superimpose on a screen of the display a predicted locus of the front end of the vehicle on the side of the passage or a straight line which contacts the predicted locus of the front end of the vehicle on the side of the passage and which is parallel with the passage.

12. A parking assisting device according to claim 5, further comprising a rotary switch for adjusting inclination of the displayed image for guidance in correspondence to an image on the display, the controller, in consideration of an inclination angle of the displayed image for guidance adjusted with the rotary switch, calculating the position where the steering operation for the steering wheel should be changed.

13. A parking assisting device according to claim 5, wherein the controller, on the basis of the position where the steering operation for the steering wheel is actually changed by a driver, calculates again a subsequent position where the steering operation for the steering wheel should be changed to provide the driver with the guide information.

14. A parking assisting device according to claim 4, further comprising an obstacle detection sensor for detecting an obstacle in the circumference,

the controller providing the driver with the guide information on the basis of a detection signal from the obstacle detection sensor.

15. A parking assisting device according to claim 1, wherein the controller provides the driver with the number of times of steering of the steering wheel required for the vehicle to be parked in-parallel

into the parking space from the initial stopping position.

16. A parking assisting device according to claim 1, further comprising a speaker for providing a driver with guide information in the form of a voice.

17. A parking assisting device according to claim 5, wherein the yaw angle detection means is comprised of a yaw rate sensor.

18. A parking assisting device according to claim 5, wherein the yaw angle detection means is comprised of a steering angle sensor and a wheel velocity sensor.